(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification⁷: B65C 9/40, 3/06, 9/00

(21) International Application Number:
PCT/EP2003/050382

(22) International Filing Date: 20 August 2003 (20.08.2003)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
BO2002A000550    29 August 2002 (29.08.2002)    IT

(71) Applicant (for all designated States except US):
AZIONARIA COSTRUZIONI MACCHINE AU-
TOMATICHE A.C.M.A. S.P.A. [IT/IT]; Via Cristoforo
Colombo, 1, I-40131 Bologna (IT).

(72) Inventors; and
(75) Inventors/Applicants (for US only): GIACOMAZZI, Gi-
anluca [IT/IT]; Via Maglio, 44, I-46044 Goito (IT). CAV-
ALLARI, Stefano [IT/IT]; Via del Meloncello, 5, I-40135
Bologna (IT).

(74) Agents: JORIO, Paolo et al.; Studio Torta S.r.l., Via
Viotti, 9, I-10121 Torino (IT).

(54) Title: METHOD AND MACHINE FOR LABELLING A SUCCESSION OF CONTAINERS BY MEANS OF A NUMBER OF INDEPENDENT LABELLING STATIONS
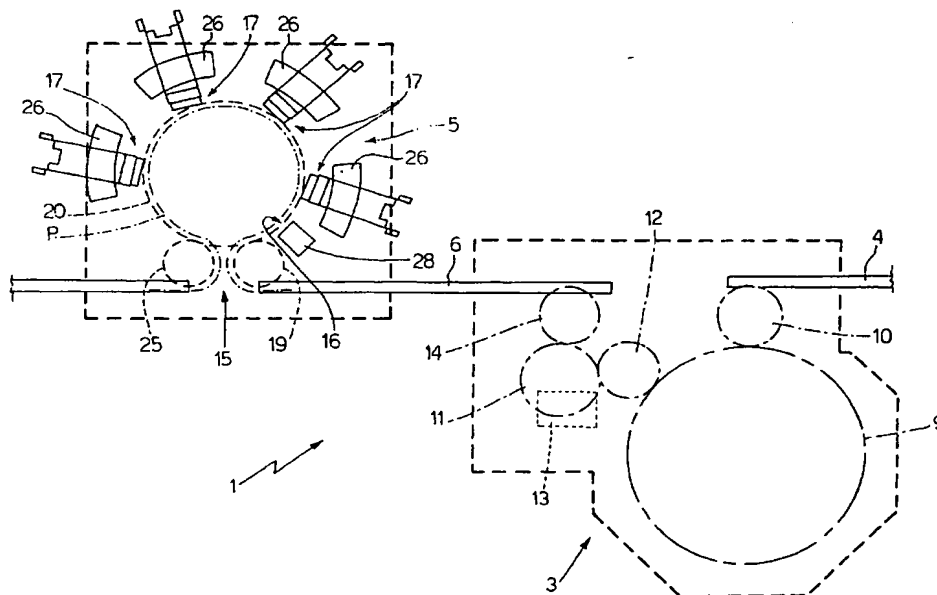
(57) Abstract: A method and machine (5) for labelling a succession of containers (2), whereby each container (2) is identified to assign to the container (2) one of a number of possible types, and the container (2) is then fed along a labelling path (P) through a number of labelling stations (17), each of which applies respective labels (7) to containers (2) falling within a respective category, and is activated to apply the label (7) to the container (2) if the container (2) falls within the respective category.

*For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.*

METHOD AND MACHINE FOR LABELLING A SUCCESSION OF CONTAINERS BY MEANS OF A NUMBER OF INDEPENDENT LABELLING STATIONS

TECHNICAL FIELD

The present invention relates to a method of labelling a succession of containers.

The present invention may be used to particular advantage for labelling a succession of bottles in a bottling plant, to which the following description refers purely by way of example.

A bottling plant comprises a number of bottling lines, each comprising a succession of machines arranged in series. More specifically, each bottling line may comprise a filling machine for receiving empty bottles from a store and filling each with a predetermined amount of a liquid product; a capping machine for applying a cap to each bottle; a labelling machine for applying one or more labels to each bottle; and, possibly, a packing machine for packing a group of bottles to form a respective package.

BACKGROUND ART

Known labelling machines, such as the type described in DE19927668, DE3925842, US5478422A1,

US5259913A1 or EP1167213A1, comprise a vertical-axis carousel conveyor for feeding the bottles along an annular path through at least one labelling station, where a label is applied to each bottle. Known

5    labelling machines may comprise either one labelling station, or two (or more) for applying, for example, a front and rear label to each bottle.

Known bottling plants of the above type are relatively bulky and expensive by requiring an

10   independent bottling line for each type of liquid product. Alternatively, the same bottling line may be used for different liquid products, but only at the expense of frequent type changes (i.e. to adapt the bottling line to a different liquid product), thus

15   obviously reducing overall output.

DISCLOSURE OF INVENTION

It is an object of the present invention to provide a method of labelling a succession of containers, designed to eliminate the aforementioned

20   drawbacks, and which, in particular, is cheap and easy to implement.

According to the present invention, there is provided a method of labelling a succession of containers, whereby each container is fed along a

25   labelling path through a number of labelling stations, each for applying a respective label to a container travelling through the labelling station; the method being characterized by assigning a category of

containers to each labelling station; identifying each container to assign to the container one of a number of possible types before the container is fed along the labelling path; and only activating each labelling

5   station to apply the label to the container travelling through the labelling station if the container falls within the category of containers assigned to the labelling station.

The present invention also relates to a machine

10  for labelling a succession of containers.

According to the present invention, there is provided a machine for labelling a succession of containers, the machine comprising a conveyor for feeding each container along a labelling path; and a

15  number of labelling stations, each located along the labelling path and for applying a respective label to a container travelling through the labelling station; the machine being characterized by comprising a recognition device for identifying each container and assigning to

20  the container one of a number of possible types before the container is fed along the labelling path; each labelling station comprising respective control means for memorizing a category of containers assigned to the labelling station, and which only activate the

25  respective labelling station to apply the label to the container travelling through the labelling station if the container falls within the category of containers assigned to the labelling station.

BRIEF DESCRIPTION OF THE DRAWINGS

A non-limiting embodiment of the present invention will be described by way of example with reference to the accompanying drawings, in which:

5      Figure 1 shows a schematic plan view, with parts removed for clarity, of part of a bottling plant featuring the labelling machine according to the present invention;

Figure 2 shows a larger-scale plan view of the

10    Figure 1 labelling machine.

BEST MODE FOR CARRYING OUT THE INVENTION

Number 1 in Figure 1 and 2 indicates as a whole a bottling line for filling bottles 2. Bottling line 1 comprises a known filling machine 3 for receiving empty

15    bottles 2 from an input conveyor 4, and feeding full bottles 2 to a labelling machine 5 by means of an intermediate conveyor 6. On labelling machine 5, a label 7 is applied to each bottle 2, and bottles 2 are then fed onto an output conveyor 8, which feeds bottles

20    2 to a known packing machine (not shown).

Filling machine 3 is a so-called multiple type for filling bottles 2 with four types of liquid of different colours, and comprises a vertical-axis carousel conveyor 9 for receiving empty bottles 2 from

25    input conveyor 4 by means of a transfer drum 10, and for feeding full bottles 2 to a vertical-axis carousel conveyor 11 by means of a transfer drum 12. Carousel conveyor 11 is connected to a known capping station 13

where a cap (not shown) is applied to each bottle 2, and the full, capped bottles 2 are fed by carousel conveyor 11 to intermediate conveyor 6 by means of a transfer drum 14.

Labelling machine 5 comprises a conveyor 15 for feeding a succession of bottles 2 along a labelling path P, which extends from the output of intermediate conveyor 6 to the input of output conveyor 8 via a recognition station 16 and four labelling stations 17.

As shown in Figure 2, conveyor 15 comprises a screw 18 located at the output of intermediate conveyor 6 and for equally spacing bottles 2 supplied by intermediate conveyor 6; and a transfer drum 19 is located at the end of screw 18 to feed bottles 2 to a carousel conveyor 20 having a vertical axis 21, and along the periphery of which are located recognition station 16 and the four labelling stations 17. More specifically, carousel conveyor 20 comprises a central hub 22, from which radiate a number of spokes 23 supporting a circular rim 24 for feeding bottles 2 along labelling path P; and carousel conveyor 20 is connected to a transfer drum 25 for extracting bottles 2 from carousel conveyor 20 and feeding bottles 2 to output conveyor 8.

Each labelling station 17 comprises a known labelling device 26, e.g. of the type described in Patent Application EP1122175A1 (in general, each labelling device 26 provides for applying any type of

label 7, e.g. hot-glued, cold-glued, or self-adhesive); and each labelling device 26 withdraws a label 7 from a respective known store (not shown in detail) and applies label 7 to a bottle 2 travelling past labelling device 26. A known fixed pad 27 downstream from each labelling device 26 performs a rolling operation on each bottle 2 to ensure firm adhesion of label 7 applied to bottle 2 by labelling device 26.

In an embodiment not shown, each labelling device 26 is mounted on a carriage slidable along a guide, and is movable along the guide by an actuating device to adapt its position with respect to carousel conveyor 20 as a function of the shape and size of bottles 2.

Recognition station 16 comprises a recognition device 28 in turn comprising an optical sensor 29 for identifying, and assigning one of four possible types to, each bottle 2 travelling through recognition station 16. Sensor 29 typically identifies each bottle 2 according to its colour (as produced by the colour of the liquid inside bottle 2, and also by the colour of bottle 2 itself). Alternatively, sensor 29 may identify each bottle 2 according to its shape and/or size.

In an alternative embodiment not shown, as opposed to recognition device 28, recognition station 16 comprises a communication device for identifying each bottle 2 by processing information from machines upstream from labelling machine 5, and in particular from filling machine 3.

Each labelling station 17 comprises a control unit 30 connected to recognition device 28, and which memorizes a category of bottles 2 so as to only activate labelling station 17 to apply label 7 to the

5     bottle 2 travelling through labelling station 17 if bottle 2 falls within the category of bottles 2 assigned to labelling station 17. The category of bottles 2 memorized in each control unit 30 and assigned to respective labelling station 17 is normally

10    defined by a variable number of bottle types equal to or greater than zero. Obviously, if the number equals zero, the labelling station 17 is never activated.

In actual use, labelling machine 5 is supplied by filling machine 3 with a succession of bottles 2 of

15    four different types. As each bottle 2 travels through recognition station 16, recognition device 28 identifies and communicates the type of bottle 2 to control units 30 of labelling stations 17; and, as each bottle 2 travels through a labelling station 17, the

20    labelling station 17 is only activated by respective control unit 30 to apply the corresponding label 7 to bottle 2 if the type of bottle 2 falls within the category memorized in respective control unit 30, i.e. only if the type of bottle 2 falls within the category

25    of bottles 2 assigned to the labelling station 17.

Each labelling station 17 may obviously apply labels to bottles 2 of one or more types, and the number of types of bottles 2 supplied to labelling

machine 5 may obviously be other (more or less) than four.

In another embodiment, each labelling station 17 can adjust the position in which respective label 7 is applied to corresponding bottle 2 as a function of the type of bottle 2.

Labelling machine 5 as described above therefore provides for applying labels 7 to different types of bottles 2, and can therefore be connected to a multiple filling machine 3 or to a number of single filling machines 3, thus reducing the overall size and cost of the bottling plant.

Moreover, labelling machine 5 provides for applying labels 7 to different types of bottles 2 with no type change required, and is therefore suitable for use on bottling lines involving frequent changes in the type of bottles produced.

CLAIMS

1) A method of labelling a succession of containers (2), whereby each container (2) is fed along a labelling path (P) through a number of labelling stations (17), each for applying a respective label (7) to a container (2) travelling through the labelling station (17); the method being characterized by assigning a category of containers (2) to each labelling station (17); identifying each container (2) to assign to the container (2) one of a number of possible types before the container (2) is fed along the labelling path (P); and only activating each labelling station (17) to apply the label (7) to the container (2) travelling through the labelling station (17) if the container (2) falls within the category of containers (2) assigned to the labelling station (17).

2) A method as claimed in Claim 1, characterized in that each container (2) is identified by feeding the container (2) through a recognition station (16) located upstream from the labelling stations (17) along the labelling path (P) and having at least one sensor (29) for identifying the container (2).

3) A method as claimed in Claim 2, characterized in that each container (2) is identified on the basis of the shape of the container (2).

4) A method as claimed in Claim 2, characterized in that each container (2) is identified on the basis

of the size of the container (2).

5) A method as claimed in Claim 2, characterized in that each container (2) is identified on the basis of the colour of the container (2).

6) A method as claimed in Claim 1, characterized in that each container (2) is identified by processing information from operating machines (3) located upstream from the labelling path (P).

7) A method as claimed in one of Claims 1 to 6, characterized in that each labelling station (17) adjusts the position in which the respective label (7) is applied to a corresponding container (2) as a function of the type of container (2).

8) A method as claimed in one of Claims 1 to 6, characterized in that each labelling station (17) comprises a respective guide; and a respective labelling device (26), which is moved along the guide to adapt its position as a function of the shape and size of the containers (2) with respect to a conveyor (15) for feeding each container (2) along the labelling path (P).

9) A machine for labelling a succession of containers (2), the machine comprising a conveyor (15) for feeding each container (2) along a labelling path (P); and a number of labelling stations (17), each located along the labelling path (P) and for applying a respective label (7) to a container (2) travelling through the labelling station (17); the machine (5)

being characterized by comprising a recognition device (28) for identifying each container (2) and assigning to the container (2) one of a number of possible types before the container (2) is fed along the labelling path (P); each labelling station (17) comprising respective control means (30) for memorizing a category of containers (2) assigned to the labelling station (17), and which only activate the respective labelling station (17) to apply the label (7) to the container (2) travelling through the labelling station (17) if the container (2) falls within the category of containers (2) assigned to the labelling station (17).

10) A machine as claimed in Claim 9, characterized in that the recognition device (28) comprises a recognition station (16) located upstream from the labelling stations (17) along the labelling path (P) and having at least one sensor (29) for identifying the container (2).

11) A machine as claimed in Claim 10, characterized in that the sensor (29) identifies each container (2) on the basis of the shape of the container (2).

12) A machine as claimed in Claim 10, characterized in that the sensor (29) identifies each container (2) on the basis of the size of the container (2).

13) A machine as claimed in Claim 10, characterized in that the sensor (29) identifies each

container (2) on the basis of the colour of the container (2).

14) A machine as claimed in Claim 9, characterized in that the recognition device (28) identifies each container (2) by processing information from operating machines (3) located upstream from the labelling machine (5).

15) A machine as claimed in one of Claims 9 to 14, characterized in that the conveyor (15) comprises a carousel conveyor (20) with a vertical axis (21).

16) A machine as claimed in one of Claims 9 to 15, characterized in that each labelling station (17) comprises a respective guide; and a respective labelling device (26), which is mounted to move along the guide to adapt its position with respect to the conveyor (15) as a function of the shape and size of the containers (2).
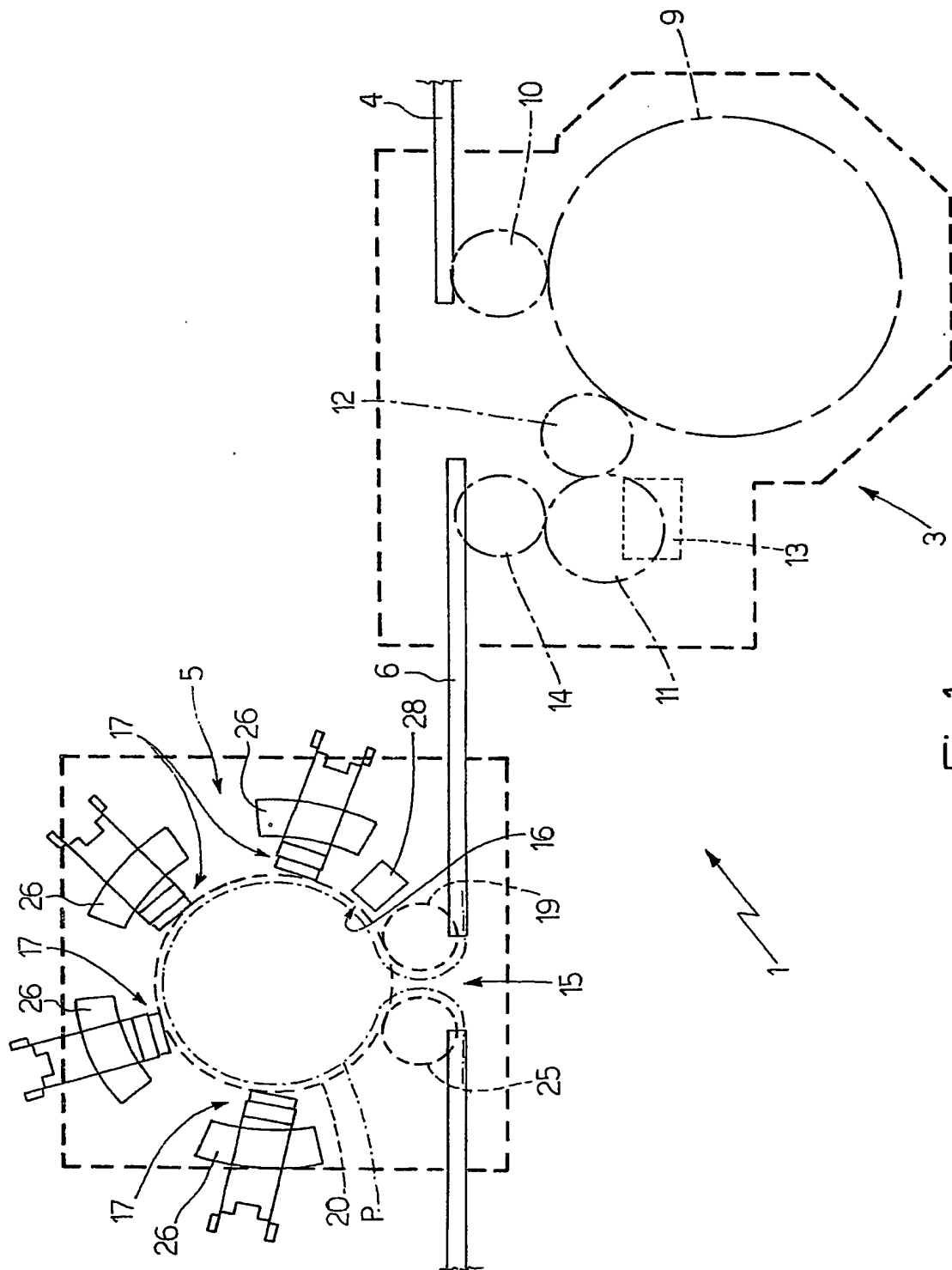
1 / 2



Fig.1

Fig.2